User Guide

Switchers

MPS 409

Media Presentation Switcher

Extron® Electronics
INTERFACING, SWITCHING AND CONTROL

68-1833-01 Rev. A
07 10

Precautions

Safety Instructions • English

This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

Caution

Read Instructions • Read and understand all safety and operating instructions before using the equipment.

Retain Instructions • The safety instructions should be kept for future reference.

Follow Warnings • Follow all warnings and instructions marked on the equipment or in the user information.

Avoid Attachments • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Warning

Power sources • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

Power disconnection • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

Power cord protection • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

Servicing • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

Slots and openings • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

Lithium battery • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Consignes de Sécurité • Français

Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).

Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

Attention

Lire les instructions• Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

Conserver les instructions• Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

Respecter les avertissements • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

Eviter les pièces de fixation • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Avertissement

Alimentations • Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.

Déconnexion de l'alimentation• Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

Protection du cordon d'alimentation • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.

Réparation-maintenance • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

Fentes et orifices • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.

Lithium Batterie • Il a danger d'explosion s'll y a remplacment incorrect de la batterie. Remplacer uniquement avec une batterie du meme type ou d'un ype equivalent recommande par le constructeur. Mettre au reut les batteries usagees conformement aux instructions du fabricant.

Sicherheitsanleitungen • Deutsch

Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.

Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

Achtung

Lesen der Anleitungen • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits-und Bedienungsanleitungen genau durchlesen und verstehen.

Aufbewahren der Anleitungen • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

Befolgen der Warnhinweise • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

Keine Zusatzgeräte • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Vorsicht

Stromquellen • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdanschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

Stromunterbrechung • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stomversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

Schutz des Netzkabels • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.

Wartung • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.

Schlitze und Öffnungen • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.

Litium-Batterie • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Instrucciones de seguridad • Español

Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.

Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

Precaucion

Leer las instrucciones • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

Conservar las instrucciones • Conservar las instrucciones de seguridad para futura consulta.

Obedecer las advertencias • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

Evitar el uso de accesorios • No usar herramientas o accesorios que no sean especificamente recomendados por el fabricante, ya que podrian implicar riesgos.

Advertencia

Alimentación eléctrica • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearia ni eliminaria.

Desconexión de alimentación eléctrica • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

Protección del cables de alimentación • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

Reparaciones/mantenimiento • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

Ranuras y aberturas • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalientamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

Batería de litio • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

安全须知 • 中文

这个符号提示用户该设备用户手册中有重要的操作和维护说明。

这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

警告

电源 • 该设备只能使用产品上标明的电源。 设备必须使用有地线的供电系统供电。 第三条线（地线）是安全设施，不能不用或跳过 。

拔掉电源 • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。

电源线保护 • 妥善布线， 避免被踩踏，或重物挤压。

维护 • 所有维修必须由认证的维修人员进行。 设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。

通风孔 • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。 不要用任何东西挡住通风孔。

锂电池 • 不正确的更换电池会有爆炸的危险。必须使用与厂家推荐的相同或相近型号的电池。按照生产厂的建议处理废弃电池。

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

The Class A limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

NOTE: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance with FCC emissions limits.

Notes, Tips, Cautions, and Warnings

NOTE: Notes call attention to information that may be of special importance.

TIP: Tips provide technical information that may be helpful during installation, for performing a procedure or adjustment, or in the operation of the USB Extenders.

CAUTION: Indicates a potential hazard to equipment or data may exist.

WARNING: Indicates a potential hazard to personal safety exists.

Contents

Introduction

About this User Guide

This guide contains information to install, configure, and operate the Extron Electronics MPS 409, Media Presentation Switcher.

In this guide, the MPS 409 may be referred to as "MPS", "MPS 409" or "switcher".

About the MPS 409

The Extron MPS 409 is a multi video format Media Presentation Switcher for small presentation systems. The MPS 409 integrates several video switchers into one product. The MPS 409 is a 2x1 VGA and audio switcher, a 2x1 DVI-D video and audio switcher, a 3x1 HDMI and audio switcher, and a 2x1 composite video and audio switcher. The MPS 409 can also function as a 9x1 video switcher and includes a mic/line input with phantom power, mic audio ducking (talkover), executive front panel lockout, and a program audio output. In addition it has the ability to combine DVI & HDMI inputs to create a 5x1 DVI/HDMI video and audio switcher. The switcher includes EDID Minder® and provides HDCP compliance.

Features

- **Multiple video inputs** — Nine inputs include two VGA (or SVGA, UXGA, RGBHV, RGBS, RGsB, or RsGsBs) inputs on 15-pin HD female connectors, two DVI (DVI-D only), three HDMI, and two composite video.
- **Multiple video outputs** — Four outputs for simultaneous (in Separate mode), or one at a time (in Single mode) display on VGA, DVI, HDMI, or composite video devices.
- **EDID Minder** — Automatically manages EDID – Extended Display Identification Data communication between the display and connected DVI, and VGA input sources. EDID Minder ensures that all sources power up correctly, whether or not they are actively connected to the display device through the switcher output.
- **HDCP compliance** — Ensures display of content protected media and interoperability with other HDCP compliant devices.
- **Multiple audio inputs** — Seven 3.5 mm female stereo input connectors include two in the VGA group, two in the DVI group, and three in the HDMI group corresponding to the video inputs. The composite video group includes two stereo RCA inputs corresponding to the two composite video inputs.
- **Multiple audio outputs** — One 3.5 mm stereo output for each VGA, DVI, and HDMI group, and one stereo RCA output for the composite video group, plus one 5-pole captive screw connector for Program Audio Out.

- **Program audio switcher** — A four input, one output stereo audio switcher allows the audio input of any video group to be selected for the program audio output, with volume and mute control. The MPS 409 features balanced/unbalanced program audio output on a 5-pole captive screw connector.
- **Microphone/line input** — One 3.5 mm captive screw connector is used for a balanced/unbalanced Mic or Line level input. The input has an adjustment range of -66 dB to +12 dB. The microphone input includes a Mute button for "talk-over", with adjustable threshold and volume control.
- **Front panel security lockout (Executive mode)** — Prevents unauthorized use in non-secure environments. Locks out all front panel functions except input selection and program volume control to prevent unauthorized changes.
- **RS-232 remote control** — A rear panel RS-232 port enables control via a control system. Extron Electronics Simple Instruction Set™ (SIS™) allows for quick and easy programming.
- **Rack-mountable** — The 1U high, full rack width, metal enclosure is rack-mountable, with supplied rack mounting brackets.
- **Multiple switcher modes** — Multiple switcher modes provide flexible signal routing capabilities to address the varying system switching environments. Users can choose among four switcher modes: Single, Separate, Single-combine, and Separate-combine.
    - **Single switcher mode** — Allows one-touch switching. When one of the nine inputs is selected, video and associated audio input signals are routed to the outputs of its group; the selected audio is also routed to the program audio output. In this mode, outputs of the other groups are muted.
    - **Separate switcher mode** — Allows independent switching of any given group. This effectively segregates switching operations so that the MPS 409 becomes four separate video switchers. While operating in separate switcher mode the program audio can be output from any group, while cueing up for another group, without interruption.
    - **Combine switcher mode** – Allows up to five HDMI and DVI source devices to be routed to a single HDMI-enabled digital display. Audio from the corresponding digital input, connected through the 3.5 mm stereo jack, is routed to the local and program audio outputs. This mode can be used when the switcher is in Separate or Single switcher mode.
- **Front-panel Mic and Program Audio output volume controls** — To streamline audio setup, the MPS 409 features front-panel Mic and program audio output volume controls which allow for easy and separate adjustment of Mic and program audio volumes. This eliminates the need for audio preamplifiers in many system designs.
- **Audio input gain and attenuation** — Allows users to set the level of audio gain and attenuation for each input channel so that there are no noticeable volume differences when switching between sources.
- **Mic talk over** — The talk over feature automatically reduces program audio when it detects a microphone signal. This eliminates the need for a separate stand-alone audio ducking processor. The talk over level is adjustable via the RS-232 control.
- **HDMI 1.3 compatible** — Supports HDMI 1.3 specification features, including data rates up to 6.75 Gbps, deep color, auto-lip sync, and HD lossless audio formats.
- **Audio breakaway** — Provides the capability to break an audio signal away from its corresponding video signal and route to the program audio output, allowing the audio channels to be operated as a separate switcher.

- **+48V phantom microphone power** — Powers a condenser microphone.
- Provides +5 VDC, 250 mA power on the HDMI and DVI outputs for external peripheral devices
- **Internal universal power supply** — The 100-240 VAC, 50-60 Hz, international power supply provides worldwide power compatibility.

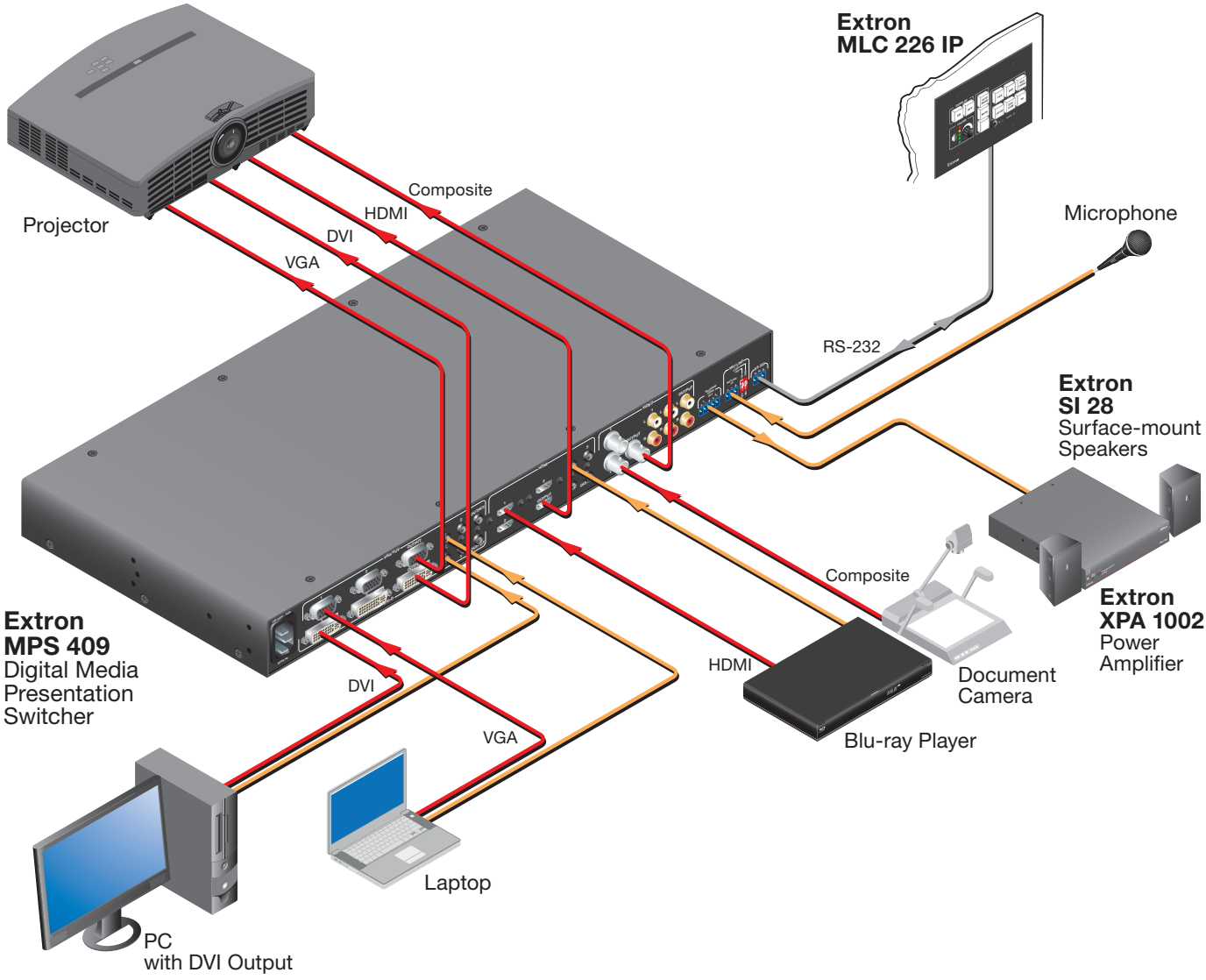


Figure 1. MPS 409 Application Diagram

Installation

This section describes the installation and the operation of the MPS 409, including:

- **Mounting the Switcher**
- **Rear Panel Connections**
- **Cabling the MPS 409 Switcher**

Mounting the Switcher

The MPS 409 is housed in 1U, full rack width metal enclosure rack- or desk-mountable. The MBD 149 1U through-desk and rack mounting kit (#**70-077-03**) is included with the switchers. The switchers may also be surface-mounted under a table, desk, or podium, or on a wall, using the optional MBU 149 1U under-desk mounting kit (#**70-222-01**).

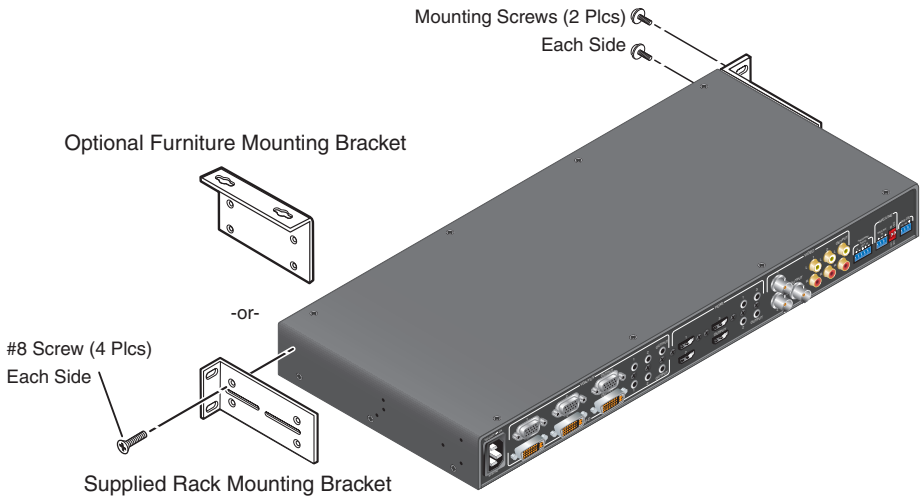


Figure 2. Mounting the MPS Switcher

UL Rack Mounting Guidelines

The following Underwriters Laboratories (UL) guidelines pertain to the safe installation of the MPS 409 in a rack.

1. Elevated operating ambient temperature — If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the device in an environment compatible with the maximum ambient temperature (Tma = +122 °F, +50 °C) specified by Extron.
2. Reduced air flow — Install the equipment in a rack so that the amount of air flow required for safe operation of the equipment is not compromised.

3. Mechanical loading — Mount the equipment in the rack so that a hazardous condition is not achieved due to uneven mechanical loading.
4. Circuit overloading — Connect the equipment to the supply circuit and consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. Reliable earthing (grounding) — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Rear Panel Connections

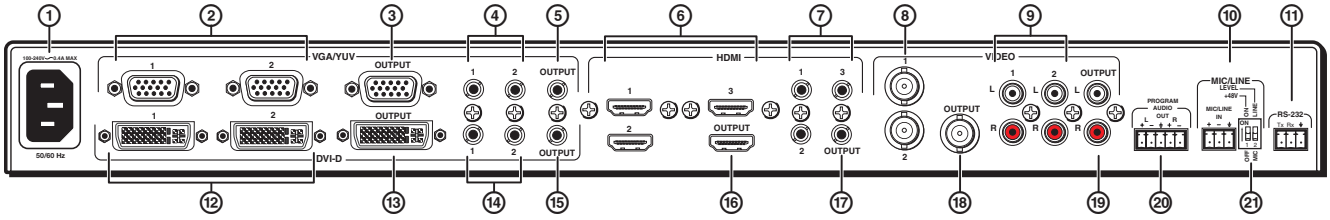


Figure 3. MPS 409 Rear Panel

① **AC power** — Connect to standard AC power: 100-240 VAC, at 50-60 Hz

② **VGA video input group** — Two female 15-pin HD connectors for VGA input (numbered 1 and 2). The connectors accept VGA or YUV signals. For YUV signals, red color channels are used for R-Y (Pr), blue color channels are used for B-Y (Pb), and green color channels are used for Y.

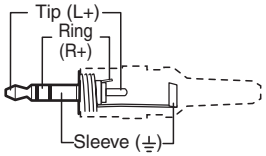
NOTE: The MPS 409 does not scale or convert video. The input signal format will also be the output format.

③ **VGA video output** — One 15-pin HD connector with the selected VGA/YUV video output.

④ **VGA audio inputs** — Two 3.5 mm stereo audio connectors corresponding to the VGA video inputs. Each audio input can be adjusted from -18 dB to +24 dB.

Connecting the 3.5 mm mini-plugs

1. Use pre-made Extron 3.5 mm stereo audio cables (see **www.extron.com**),
   or
   cut bulk audio cable and solder a 3.5 mm mini-plug to the cable as shown.



3.5 mm Stereo Plug Connector
(unbalanced)

Figure 4. 3.5 mm, Mini-Plug Audio Connector

2. Plug the connector into the MPS 409.

⑤ **VGA audio output** — One 3.5 mm stereo audio output connector with audio output from the selected VGA input. Connect to the audio input of an audio amplifier. See figure 4 above for wiring.

⑥ **HDMI video input group** — Three HDMI connectors for HDMI compliant video input (numbered 1 through 3). Connect to any HDMI source device using standard HDMI cable.

⑦ **HDMI audio inputs** — Three 3.5 mm stereo audio connectors corresponding to the HDMI video input sources. See Figure 4 above for wiring.

⑧ **Composite video input group** — Two BNC connectors for composite video (numbered 1 and 2) from any composite video source device.

⑨ **Composite audio inputs** — Four RCA connectors for two stereo audio inputs corresponding to the two composite video sources.

⑩ **Mic/Line input** — One 3-pole captive screw connector switchable between mic and line level inputs. A two position DIP switch (u) selects mic or line input level.

Connecting the 3-pole captive screw microphone connector

1. Use a pre-made 3-pole captive screw microphone cable,
   or
   cut bulk microphone cable, and attach the 3-pole captive screw connector to the cable.

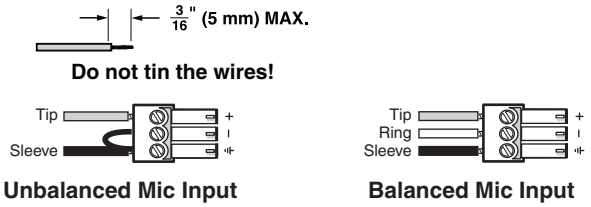


Figure 5. 3.5 mm, 3-Pole Captive Screw Microphone Connector

NOTE: Do not tin the mic wire leads before installing into the connector. Tinned wires are not as secure in the connector and could be pulled out.

2. Plug the 3-pole captive screw connector into the MPS 409.

⑪ **RS-232 remote** — One female 9-pin D connector for a host computer or a controller using Simple Instruction Set (SIS) or Windows-based control software.

Connecting the 3-pole captive screw RS-232 connector

For RS-232 control, use a control cable with only pins 2, 3, and 5 connected. See **SIS Programming and Control on page 20** for SIS commands definitions and details on how to install and use the control software.

The RS-232 input uses a 3-pole captive screw connector wired as shown:

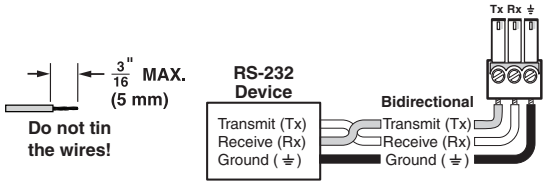


Figure 6. RS-232 Captive Screw Connector Wiring

See **Remote Control Port (RS-232) on page 20** for additional wiring details.

⑫ **DVI-D video input group** — Two female DVI connectors for DVI-D signals only (numbered 1 and 2). Connect DVI-D sources to either or both connectors.

⑬ **DVI-D video output** — Connect a DVI-D display device to this connector.

⑭ **DVI audio inputs** — Two 3.5 mm stereo audio connectors corresponding to the DVI video inputs. Connect to the audio output of the corresponding DVI-D video input. See figure 4 for wiring.

⑮ **DVI audio output** — 3.5 mm stereo audio output connector with audio output from the selected DVI input. Connect to the audio input of an audio amplifier. See figure 4 for wiring.

⑯ **HDMI video output** — Connect an HDMI display device for output from the selected HDMI input.

⑰ **HDMI audio output** — 3.5 mm stereo connector with audio output from the selected HDMI input. See figure 4 for wiring.

⑱ **Composite video output** — One BNC connector with selected composite video output for a composite video display device.

⑲ **Composite audio output** — One stereo pair of RCA connectors with audio output from the selected composite video input.

⑳ **Program audio output** — 5-pole captive screw connector with selected audio output.

Connecting the 5-pole captive screw stereo output connector

Balanced or unbalanced program audio output is available on the MPS 409 using a 3.5 mm, 5-pole captive screw connector. Refer to the following illustration for proper wiring.

CAUTION: For unbalanced audio output, connect sleeves to the center ground pin. DO NOT connect sleeves to the negative (-) contacts.

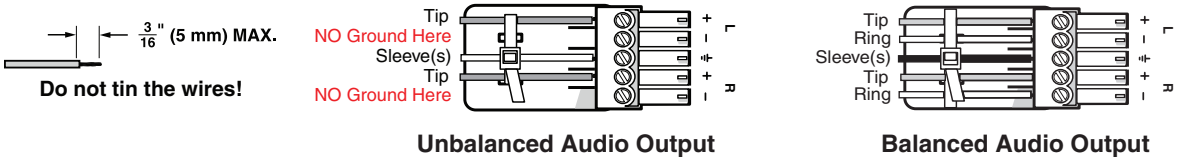
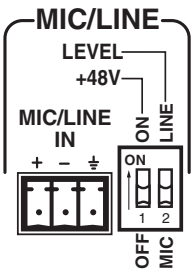


Figure 7. 3.5 mm, 5-Pole Captive Screw Audio Output Connectors

NOTE: Do not tin the audio leads. Tinned wires are not as secure in the connector and could be pulled out.



㉑ **Phantom Power and Mic/Line Input selection** — Two 2-position DIP switches. +48V selects phantom power for the mic input and level selects between mic or line level for the mic/line input (⑩).

If an audio source is connected via the Mic/Line input, set the Mic/Line switch to "Line" and the Phantom power switch Off. The line input is mono only. Use the microphone/line input connection diagram, (⑩), to wire the device.

If the input is a microphone, set the Level switch to "Mic". If the microphone requires phantom power set the +48V switch to On.

Cabling the MPS 409 Switcher

The MPS switcher can be connected to as many as 9 input devices simultaneously. It can output to as many as four devices (three in combine mode) simultaneously. Outputs can be configured for simultaneous outputs from each of the four input groups, VGA/YUV, DVI-D, HDMI, composite or one at a time from a selection of the nine inputs. Follow the steps below and see the installation example in figure 1.

1. Turn off power to the MPS switcher and all devices that will be connected to it.
2. If the MPS switcher is to be rack, table/wall, or through-desk mounted, position the brackets and insert the mounting screws. See **Mounting the Switcher on page 4**.
3. Attach up to two VGA, three HDMI, two DVI-D, and two composite video input devices to the MPS switcher. See **Rear Panel Connections on page 6**.
4. Connect the switcher VGA, HDMI, DVI and Composite video outputs (up to four, one of each video format) to the appropriate display device inputs. See **Rear Panel Connections on page 6**.
5. For stereo audio input, connect up to 9 audio sources to the corresponding audio inputs of the VGA, HDMI, DVI, or composite video groups. See **Rear Panel Connections on page 6**.
6. For stereo output, connect an audio output device to each of the four groups and an audio amplifier to the Program Audio connectors. See **Rear Panel Connections on page 6**.
7. If the switcher is to be connected to a computer or host controller for remote control, connect the host RS-232 cable to the 3-pole captive screw connector (⑪) of the switcher. For an RS-232 pinout table, see **Remote Control Port (RS-232) on page 20** .
8. Power up the input and output devices, then connect power to the rear AC connector of the MPS switcher.

Operation

This section discusses how to connect, configure, and operate the MPS 409. Topics that are covered include:

- Front Panel Features
- Front Panel Operation
- Program Audio
- EDID Minder
- HDCP

Front Panel Features

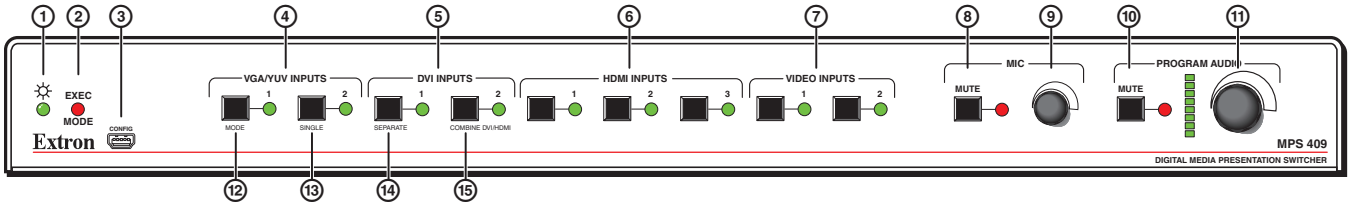


Figure 9. Front Panel Details of the MPS 409 Switcher

① **Power Indicator —** This LED lights when power is applied.

② **Executive Mode indicator LED —** This red LED lights when Executive mode (front panel lockout) is active.

③ **USB Configuration Port —** Mini Type-B- female USB jack used for configuration of the switcher and flash upgrades of the firmware.

Video/Audio Group Buttons

The controls for the four independent switchers are grouped by input type.

④ **VGA/YUV Inputs group —** VGA/YUV buttons 1 and 2 select the input for the VGA/YUV and audio switcher section. The LEDs to the right of each button (when lit) indicate the selected input.

⑤ **DVI Inputs group —** DVI buttons 1 and 2 select the input for the DVI and audio switcher sections. The LEDs to the right of each button (when lit) indicate which input has been selected for output.

⑥ **HDMI Inputs group —** HDMI buttons 1 through 3 select the input for the HDMI and audio switcher section. The LEDs to the right of each button (when lit) indicate which input has been selected for output.

⑦ **Composite Inputs group —** Video buttons 1 and 2 select the input for the composite video andaudio switcher section. The LEDs to the right of each button (when lit) indicate which input has been selected for output.

Microphone and Program Audio Controls

⑧ **Mic Mute —** Toggles the microphone mixer on and off to provide microphone talk-over for the program audio. The LED (when lit) indicates the microphone input is muted.

⑨ **Mic Volume —** This adjustment knob controls the volume of the microphone. Rotating the Mic Volume control unmutes the microphone.

⑩ **Program Audio Mute —** Toggles program audio on and off. The LED (when lit) indicates program audio is muted. When muted, inputs may be switched without unmuting.

⑪ **Program Audio Control and Indicator —** Increase or decrease program audio output with this volume knob. The eight segment LED shows the real-time output level whether the mute button is on or off. Rotating this knob automatically unmutes the program output.

Switcher Mode Control

Four front panel buttons, VGA/YUV Inputs 1 and 2 and DVI inputs 1 and 2 (⑫, ⑬, ⑭, ⑮), have secondary functions.

⑫ **Mode —** Press and hold this button for more than 3 seconds to view the switcher status indicated by ⑬, ⑭, and ⑮ below. All front panel LEDs will be unlit except those indicating the current mode. The mode button also allows mode changes when used in combination with other buttons.

⑬ **Single Switcher mode (default mode) —** To enter Single Switcher mode, press and hold the Mode button (⑫) for 3 seconds, then press and release the Single button (⑬). The associated LED indicates the mode is on (when lit) or off. When the Mode button is released, the LED resumes input indication.

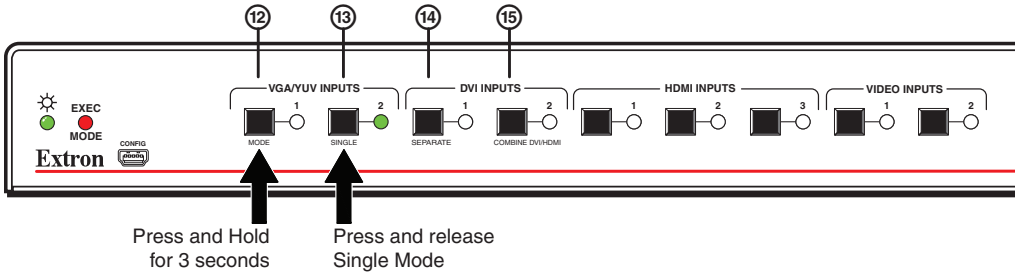


Figure 10. Enter Single Switcher Mode

⑭ **Separate Switcher mode —** To enter Separate Switcher mode, press and hold the Mode button (⑫) for 3 seconds, then press and release the Separate button (⑭). The associated LED indicates the mode is on (when lit) or off. When the mode button is released, the LED resumes input indication.

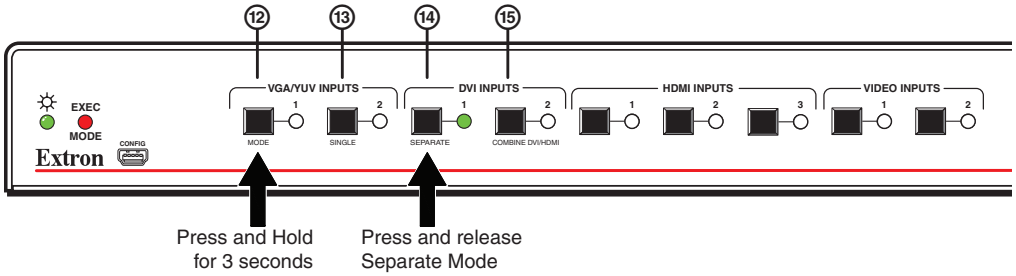


Figure 11. Enter Separate Switcher Mode

⑮ **Combine DVI/HDMI mode —** To enter Combine Switcher mode, press and hold the Mode button (⑫) for 3 seconds, then press and release the Combine DVI/HDMI button (⑮). The associated LED indicates the mode is on (when lit) or off. When the mode button is released, the LED resumes input indication.

Front Panel Operation

The MPS switcher can be connected to as many as nine input devices and four output displays plus an audio amplifier. It operates in one of four switching modes: single (the default), separate, single-combine, or separate-combine.

The functions of the front panel controls are described in the following sections. Each input group; VGA/YUV, DVI-D, HDMI, and composite, have one video and one audio output each. The output is switchable only between the inputs of the corresponding group, except in combine mode.

Although the wiring and connection of the switcher are identical, the four modes operate differently.

Switcher Operating Modes

The switcher operating modes are:

- Single switcher (default) mode emulates one switcher with 9 inputs (9x1).
- Separate switcher mode allows the four groups of inputs (DVI, HDMI, VGA, Composite video) to be used as individual switches, creating four independent switchers.
- Single-combine mode operates exactly as the normal single mode except the three HDMI and two DVI inputs are output on the HDMI output.
- Separate-combine mode operates exactly as the normal separate mode except the three HDMI and two DVI inputs are output on the HDMI output.

NOTE: The switcher does not convert signal formats between VGA and DVI/HDMI nor will it scale or convert between other input formats.

View Mode

The current switcher mode can be determined by observing the input LEDs. If the unit is in separate switcher mode, up to four input LEDs can be lit (one in each group). In single switcher mode only one input LED at a time is lit.

To view the current switcher mode, press and hold the Mode button (VGA/YUV #1) for more than 3 seconds.

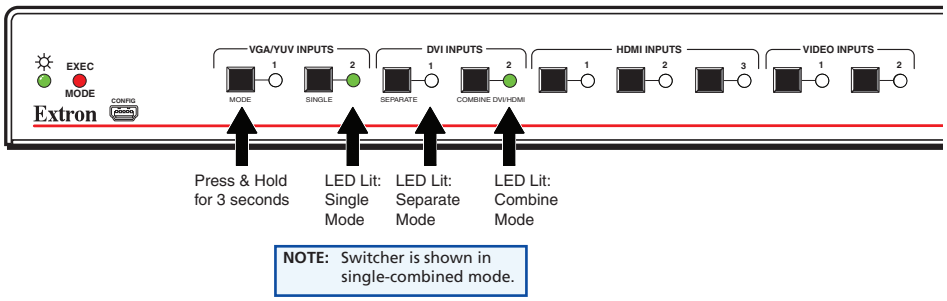


Figure 12. Front Panel Button/LED Functions During View Mode

To change modes:

1. Press and hold the mode button for more than 3 seconds,
2. Press the button that corresponds to the desired mode change,
3. Release all buttons.

NOTE: Mode changes do not take effect until the Mode button is released.

Input Selection — Single Switcher Mode

In single switcher mode (default) the switcher emulates a single nine input switcher (9x1). In this mode, when an input is selected from any group, the green LED indicator to the right of the button lights, and the selected input (video and audio) is routed to the output for that group. The selected audio is also connected to the program audio output. All other outputs, (except program audio) are muted.

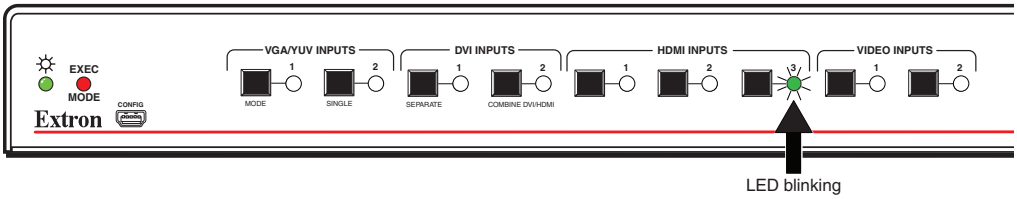


Figure 13. Front Panel Input Selection-Single Mode

In the example, HDMI input 3 video and audio, (indicated by the blinking LED), is selected. All other input LEDs are off. To select a different input, press the desired input button.

Input Selection — Separate Switcher Mode

There are four input selection groups on the front panel: VGA/YUV, DVI, HDMI and (composite) Video. These groups correspond to the four independent A/V switchers (in separate switcher mode) available.

Each input group has two (three for HDMI) numbered input selection buttons, allowing selection from among the input sources in that group.

The output of each of the four groups is always active and the selected input audio/video is available on each group's output. Program audio output is taken from the most recently selected input. That group (input) is indicated by a flashing LED, while the other groups are indicated by solid LEDs. See **Program Audio on page 15** for more details.

In the example below each group has an input selected. In addition, the blinking LED indicates which input audio is also routed to the program audio output.

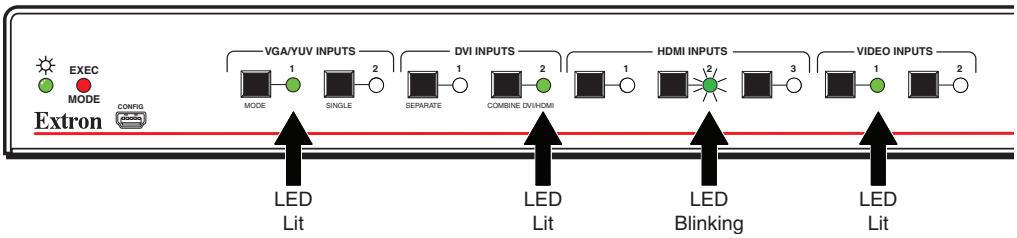


Figure 14. Front Panel Input Selection-Separate Mode

Program Audio Breakaway

Both separate and single switcher modes provide audio breakaway allowing routing of the audio signal from any input or input group to the program audio output independently from the video signal. It is available via software control only. See **Program Audio Breakaway on page 23**

Combine Mode

Combine mode switches a selected HDMI/DVI input to the HDMI output, deactivating the DVI audio and video outputs. This enables the MPS 409 to function as one 5x1 HDMI/DVI and audio switcher, adding VGA/YUV and Video inputs. Combine mode can be used whether the switcher is in separate or single switch mode. All other inputs and outputs function according to the selected switcher mode.

Input selection — Single-combine mode

In single-combine mode, the front panel input selection LEDs operate the same as standard single mode; a single lit LED indicates the current input selection.

Input selection — Separate-combine mode

In separate-combine mode, only one input selection is allowed from the HDMI/DVI groups along with a single input selection from the VGA/YUV group and another from the video group. So there will only be three front panel LEDs lit in combine mode rather than four when in separate switcher mode.

Front Panel Security Lockout (Executive mode)

To prevent unauthorized configuration changes, executive mode limits front panel access. Control and monitoring are still available using the rear panel RS-232 or front panel USB port and the control software. The front panel Exec Mode LED is lit when either lockout mode is active.

Executive mode contains two levels:

- Mode 1 locks out the Mic Mute and Mic Volume control. When active, if mic control or mute are attempted via the front panel, the mic mute LED will flash once.
- Mode 2 locks all front panel functions except Executive mode. When any adjustment is attempted via the front panel, all front panel LEDs flash once.

To toggle through the executive modes:

1. Press and hold the mode button for more than 3 seconds,
2. Press the HDMI input 1 button to toggle through the executive modes.
   a. If executive mode is not active (Exec mode LED off), the switcher toggles to executive mode 1, the Mic Mute LED flashes three times, and the exec mode LED turns on. Release both buttons to enter executive mode 1.
   b. If already in mode 1, the switcher toggles to mode 2 and the exec mode LED remains on. All front panel LEDs flash three times. Release both buttons to enter executive mode 2.
   c. If in mode 2, the switcher exits executive mode and turns off the Exec mode LED. Release both buttons to exit executive mode.

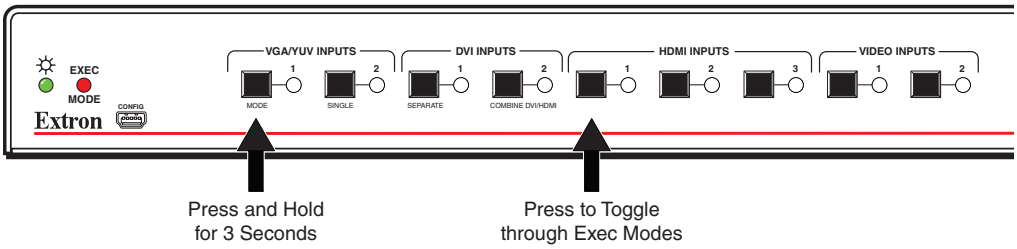


Figure 15. Toggle Executive Modes

Program Audio

The selected audio input is routed to the program audio output according to the switcher mode. The input LED selected for program audio output blinks.

Program Audio Selection

Single switcher mode

In single switcher mode, audio from the selected input is routed to the program audio output. If combine mode is active, when a DVI input is selected, DVI audio is available on the HDMI audio output and the program audio output.

Separate switcher mode

In separate switcher mode, the selected audio input from only one of the four input groups is routed to the program audio output. The selected input is indicated by a flashing input LED and is always the last input selected. The selected input LEDs of the other three groups are steadily lit.

If combine mode is active, when a DVI input is selected, DVI audio is available on the HDMI audio output and the program audio output.

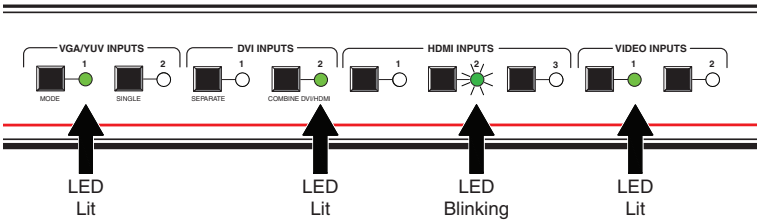


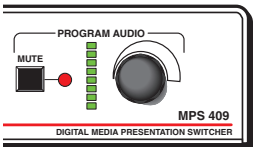
Figure 16. Program Audio Selection (HDMI Program Audio Selection Shown)

Program Audio Breakaway

Both separate and single switcher modes provide audio breakaway which allows routing of the audio signal from any input to the program audio output independently from the video signal. It is available via software control only. See **Program Audio Breakaway on page 23**

Program Audio Volume Control

Using the front panel volume control knob, the user can increase or decrease program volume. The adjustment of program volume has no effect on the Mic volume so program audio can be muted while the Mic input is still active. The program audio volume has a range from 0-100 allowing the product to be controlled with a MediaLink controller. The associated LEDs light from bottom to top with increasing volume.



Program Audio Mute

The Program Audio mute button toggles the audio on and off. The indicator LED to the right of the button lights red when program audio is muted. Press the mute button again to unmute the output.

Changing the audio input selection does not unmute the program audio output.

Changing the program audio control knob unmutes the program audio output.

NOTE: Program audio mute does not mute the microphone input.

Audio Gain and Attenuation Adjustments

Individual audio inputs can be adjusted over a range of -18 dB to +24 dB using the program audio mute button and program audio volume control knob. These adjustments can be used to **normalize** the input audio levels so that output volume is consistent for all inputs.

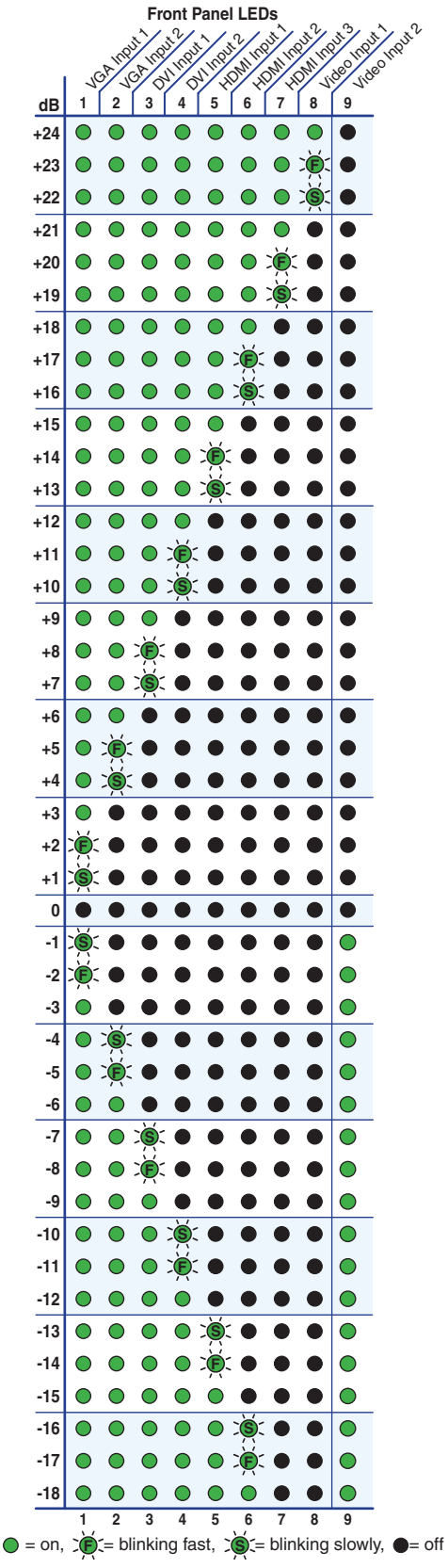
The front panel input LEDs provide a status of the current input gain/attenuation levels. When adjusting the audio level, the LEDs used for inputs 1-8 (VGA inputs 1-2, DVI inputs 1-2, HDMI inputs 1-3, and video input 1) function as indicators of the current audio level for the selected input as shown in the table.

The LED input associated with video Input 2 functions as an indicator of gain (+) or attenuation (–). If Input LED 9 (video input 2) is off, audio is at a positive level (gain). If the LED is on, audio is negative (attenuated).

To adjust the input audio level from the front panel:

1. Press and hold the Program Audio Mute **AND** Mic mute buttons for 3 seconds. The two Mute LEDs flash three times.
2. Press the input button for the audio to be adjusted. If no input button is pressed, the switcher times out and exits audio level adjustment mode.
3. Once the input button is pressed, the front panel input LEDs indicate the current gain or attenuation setting. Factory default is 0 dB (all LEDs off). Rotate the Program volume knob clockwise to increase and counterclockwise to decrease the audio level. The front panel LEDs display the level setting as the knob is adjusted.
4. Once the desired level is achieved, to adjust another input, select it within 3 seconds. If audio adjustments are complete:
   a. Do not press any front panel buttons for at least 3 seconds to exit the gain/attenuation mode, or
   b. Press the program audio and Mic mute buttons to exit the gain/attenuation mode.

At any time during the adjustments, if front panel buttons are not pressed or the program knob is not rotated for 3 seconds, the switcher times out and the gain/attenuation mode is exited.



Microphone Controls

Mic on/off

Mic volume and mute are controlled from the front panel. The Mic mute button toggles the Mic input on or off. The corresponding red LED illuminates when Mic volume has been shut off (muted).

When the Mic input is enabled it is mixed with the program audio output. Mic volume is a stepped encoder, adjusted at a rate of 1 dB per step of the control. Clockwise rotation increases and counterclockwise decreases the Mic volume.

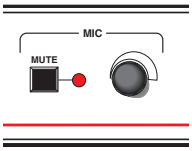


Figure 17. Mic Volume and Mute

Talk-over

The MPS 409 also features talk-over to automatically reduce program audio volume when microphone audio is present allowing the microphone audio to be heard more intelligibly. When the switcher detects an audio signal from the Mic input, it immediately reduces or "ducks" the program audio volume. When microphone audio is not detected for a period of one second, it increases the program audio level at a rate of 3 dB per second until it reaches the original volume level.

The program audio can be ducked from 0-30 dB (default is 6 dB), adjustable through software control only. The Mic level threshold where ducking is initiated is adjustable from 0-15 dB through software control only. See **Mic talk-over threshold on page 24** .

Mic volume

After turning on (unmuting) the Mic input, use the Mic volume control knob to adjust the volume of the microphone output. When the control knob is turned, volume increases at a rate of 1 dB per step. The program audio level has no affect on Mic volume.

Setting mic talk-over threshold

Microphone threshold and program audio ducking levels can only be adjusted using RS-232 control. See **SIS Programming and Control on page 20** for more information.

1. Adjust program audio for nominal listening levels.
2. Turn on the microphone by pressing the Mic Mute button.
3. Speak into the microphone in a normal voice. The main program level should drop immediately.
   a. If the microphone consistently cuts off the beginning of speech, or cuts out sections of audio, adjust the threshold level via RS-232 control. See **Mic talk-over threshold on page 24**
   b. If the program level is too high during talk-over, but is the proper level for times where talk-over is not active, see **Program audio ducking level in talk over mode on page 24**.
4. Stop speaking into the microphone. The main program audio should gradually increase to the previous level within 2-4 seconds. If not, increase the threshold level. See **Mic talk-over threshold on page 24**.

EDID Minder

The DVI and VGA/YUV groups feature EDID Minder, ensuring that each input source reads the EDID of the output display even when not selected. The result is the video source powers up properly and reliably outputs content when selected. The EDID remains in the selected mode (automatic or user assigned) even after loss of power.

The DVI group does not support HDCP by default. In order to support HDCP, EDID Minder must be disabled. EDID Minder can be disabled for the DVI group using SIS commands.

Automatic Mode — If an output display has not been connected, a default EDID file is placed on the VGA and DVI inputs according to the following table:

Input Group	Default EDID
VGA	1024 x 768 @ 60 Hz
DVI	1024 x 768 @ 60 Hz

Figure 18. Default EDID Resolutions

When a display is connected to the group output, the EDID of that display device is read and replaces the default EDID on each input. The EDID remains even if the display is removed. If a different display is connected or a user assigned EDID is selected, the previous EDID is overwritten.

NOTE: When the HDMI/DVI combine mode is enabled at the same time EDID Minder is enabled on the DVI inputs, the EDID will be updated with the HDMI output device EDID.

User assigned EDID Mode — Using SIS commands, an EDID file can be selected from a table of 19 EDID files. One additional EDID file location is reserved for user-loaded EDID files for the VGA and DVI groups. Once a user assigned EDID is chosen, the switcher stores it at the inputs and no longer polls for the EDID of a connected display. The chart below lists the native resolution of each factory EDID file and timing characteristics associated with each.

EDID Resolution Table

EDID	Native Resolution	Refresh	Pixel Clock
0	Automatic Mode		
1	800 x 600	60 Hz	40 MHz
2	1024 x 768	60 Hz	65 MHz
3	1280 x 768	60 Hz	79.5 MHz
4	1280 x 800	60 Hz	83.5 MHz
5	1280 x 1024	60 Hz	108 MHz
6	1360 x 768	60 Hz	85.5 MHz
7	1440 x 900	60 Hz	106.5 MHz
8	1400 x 1050	60 Hz	121.75 MHz
9	1680 x 1050	60 Hz	119 MHz
10	1600 x 1200	60 Hz	162 MHz
11	1920 x 1200	60 Hz	154 MHz
12	720p, basic audio	50 Hz	74.25 MHz
13	720p, basic audio	60 Hz	74.25 MHz
14	720p, full audio	50 Hz	74.25 MHz
15	720p, full audio	60 Hz	74.25 MHz
16	1080p, basic audio	50 Hz	148.5 MHz
17	1080p, basic audio	60 Hz	148.5 MHz
18	1080p, full audio	50 Hz	148.5 MHz
19	1080p, full audio	60 Hz	148.5 MHz
20	User loaded		
NOTE:	**Basic Audio** supports: 2-Ch PCM audio **Full Audio** supports: 2-Ch PCM, 8-Ch PCM, 8-Ch AC-3, 8-Ch DTS, 8-Ch DD+, 8-Ch DTS-HD, & 8-Ch Dolby TrueHD		

NOTE: Basic audio = 2-channel PCM audio
Full audio = support for various digital encoding formats and up to 8-channel audio

If the display connected to the VGA output of the switcher does not support DDC, or the switcher does not obtain EDID from the output, the default resolution (2) is used.

HDCP

The DVI and HDMI groups are HDCP compliant. When EDID Minder is enabled, (default), HDCP is not supported on the DVI inputs.

HDCP communication occurs between the selected input source and the output device directly (pass-though).

SIS Programming and Control

This section discusses SIS programming and control of the MPS 409 including:

- **Connection Options**
- **Host-to-MPS Communications**
- **Command/Response Table**
- **Updating Firmware**

Connection Options

The MPS 409 can be remotely connected via a host computer or other device (such as a control system) attached to the rear panel RS-232 port or the front panel USB Config port.

The switcher can be set up and controlled using SIS (Simple Instruction Set) commands. SIS commands may be executed using the Extron DataViewer program, found on the Software Products DVD included with the product or at **www.extron.com**.

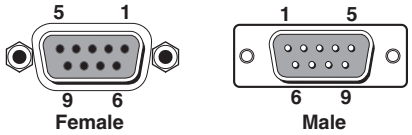
Remote Control Port (RS-232)

The MPS switcher RS-232 port connector (3-pole captive screw) is used to connect to a host or external controlling device, such as a computer or control system, which can generate the proper command codes and recognize switcher responses.

NOTE: The cable used to connect the RS-232 port to a computer or control system may need to be modified by removing pins or cutting wires. If unneeded pins are connected, the switcher may hang up. See **Connecting the 3-pole captive screw RS-232 connector on page 7**, for more information on wiring the connectors.

The RS-232 connector on the PC is a 9-pin D female with the following pin designations:

Pin	RS-232 function	Description
1	-	No connection
2	Tx	Transmit data
3	Rx	Receive data
4	-	No connection
5	Gnd	Signal ground
6,7	-	No connection
8,9	-	No connection



Commands and responses for programming the MPS 409 from a host system connected to the RS-232 port are listed later in this chapter.

USB Configuration Port

Drivers for the MPS 409 USB configuration port are loaded automatically when Dataviewer or Firmware Loader, included on the software disc or available at **www.extron.com**, are loaded.

Host-to-MPS Communications

The MPS switcher accepts Simple Instruction Set (SIS™) commands through the RS-232 or USB configuration port. SIS commands consist of one or more characters per command field. They do not require special characters to begin or end the command character sequence. Each response to an SIS command ends with a carriage return and a line feed (CR/LF = ↵), which signals the end of the response character string. A string is one or more characters.

MPS Switcher-initiated Messages

When a local event occurs, such as a front panel operation, the MPS switcher responds by sending a message to the host. The MPS 409-initiated messages are listed below (underlined).

Boot-up messages

(c) Copyright 2010, Extron Electronics, MPS 409, V*x.xx* ↵

The copyright message is initiated by the switcher when it is first powered on. V*x.xx* is the firmware version number.

Status change messages

The switcher-initiated status change messages are a result of front panel operations (actual or software-simulated). The status change messages are the same as switcher responses to certain commands. See the last column of the command/response tables on the following pages.

MPS Switcher Error Responses

When the MPS switcher receives an SIS command and determines that it is valid, it performs the command and sends a response to the host device. If the switcher is unable to perform the command because the command is invalid or contains invalid parameters, it returns an error response to the host. The error response codes are as follows:

E01 ↵ — Invalid input channel number (too large)

E10 ↵ — Invalid command

E13 ↵ — Invalid value (out of range)

Command/Response Table

Using the Command/Response Table

The command/response table is shown on the following pages. Lower case characters are acceptable in the command field only where indicated. Symbols are used throughout the table to represent variables in the command/response fields. Symbol definitions and an ASCII-to-hexadecimal (HEX) conversion table are shown below. Command and response examples are shown throughout the command/response table.

Symbol definitions

↵ = CR/LF (carriage return/line feed) (hex 0D 0A)

← = Carriage return (no line feed, hex 0D)

• = Space character

Esc = Escape key (hex 1B)

X1 = Audio/Video Groups 1 through 4:
1 = VGA,
2 = DVI,
3 = HDMI,
4 = composite video.

NOTE: X1 = 3 and 4 are not compatible with EDID Minder commands.

X2 = Inputs 0 through 2 (0-3 for HDMI) for each group (Input 0 = off, not available in single switcher mode.)

NOTE: Selecting input 3 for a group with only 2 inputs will return error E01.

X3 = 0 = off, 1 = on

X4 = 0 to 12 (mic gain)

X5 = 1 to 66 (mic attenuation)

X6 = -66 to +12 (dB mic gain level)

X7 = 1 = single switcher mode (combine mode disabled),
2 = single switcher mode (combine mode enabled),
3 = separate switcher mode (combine mode disabled),
4 = separate switcher mode (combine mode enabled),

X8 = 0 to 15, default = 8 (mic talk-over threshold level)

X9 = 0 to 12 (input number in simple address)

X10 = 0 to 100 (program volume adjustment range)

X11 = Inputs 0 through 9 for single input addressing, X11 = (X1 - 1) times 4 + X2, 0 = mute

X12 = 0 to 30 (program audio ducking level in talk over mode, 0 = off)

X13 = Audio Input gain/attenuation (-18 dB to +24 dB, in 1 dB steps)

X14 = Audio Input gain value in dB (0 to 24)

X15 = Audio Input attenuation value in dB (-1 to -18)

X16 = value of EDID setting from lookup table (0-20):
0 = automatic mode,
1-19 = assigned EDIDs,
20 = user loaded EDID

X17 = 128 or 256 Byte EDID raw HEX (text form)

X18 = native resolution and refresh rate from selected EDID

X19 = MPS 409 name. Name is a text string of up to 24 alpha-numeric characters.

Command/response table for SIS commands

Command	ASCII Command (host to switcher)	Response (switcher to host)	Description	Switcher-initiated messages
Input selection (in separate switcher mode only)				
Select video and audio input	X1 * X2 !	Chn X1 * X2 ↵	Group X1 and input X2 are selected. X1 = Group 1 through 4 (1 = VGA, 2 = DVI, 3 = HDMI, 4 = Composite). X2 = Inputs 0–2 (0-3 for HDMI) for each group (input 0 = off).	x
Input selection (in single switcher mode only)				
Select video and audio input	X11 !	Chn X11 ↵	X11 = Inputs 0 through 9 for single input addressing, X11 = (X1 - 1) times 4 + X2.	
Switcher mode select				
Select switcher mode	X7 *1#	Mod X7 ↵	X7 = switcher mode: 1 = Single mode (default) DVI/HDMI combine disabled, 2 = Single mode DVI/HDMI combine enabled, 3 = Separate mode, DVI/HDMI combine disabled, 4 = Separate mode, DVI/HDMI combine enabled.	
View switcher mode	1 #	X7 ↵		
Input EQ (DVI and HDMI inputs only				
Adjust input EQ (per input)	Esc X1*X2*X3 ISEQ←	X1•X2 ISEQ•X3 ↵	X3 = 0 (low, +6 db), X3 = 1 (high, +18 db)	
View input EQ setting (all supported inputs	Esc ISEQ←	ISEQ•X3•X3•X3•X3•X3↵		
Program Audio Breakaway				
Select program audio input	X1 * X2 $	Pra X1 * X2 ↵	Selects any input from any group to be routed to the program audio output. X1 = group 1 through 4 (1 = VGA, 2 = DVI, 3 = HDMI, 4 = Composite Video). X2 = inputs 0 through 2 (0–3 for HDMI) for each group (input 0 = off).	x
Program audio gain/attenuation				
Set gain to specific value	X11*X14 G	InX11•AudX13↵		
Set attentuation to specific value	X11*X15 g	InX11•AudX13↵		
Increment level of specific input	X11 +G	InX11•AudX13↵		
Decrement level of specific input	X11 –G	InX11•AudX13↵		
View audio level of specific input	X11 G	X13↵		

Command	ASCII Command (host to switcher)	Response (switcher to host)	Description	Switcher-initiated messages
Program audio ducking level in talk over mode				
Adjust audio ducking level	X12 * 58#	Adl X12 ↵	Adjusts how much (X12 = 0 to 30 dB) the program audio ducks (automatically decreases) in talk over mode. 0 = ducking off.	
Increment audio ducking	+*58#	Adl X12 ↵		
Decrement audio ducking	–*58#	Adl X12 ↵		
View audio ducking level	58#	X12 ↵		
Volume level				
Specify volume variable	X10 V/v	Vol X10 ↵	Volume level is X10. X10 = 000 – 100 (program volume adjustment range).	x
Increment volume	+V	Vol X10 ↵	Volume level is X10.	
Decrement volume	–V	Vol X10 ↵	Volume level is X10.	
View volume	V	X10 ↵	Volume level is X10.	
Audio mute	X3 Z/z	Amt X3 ↵	X3: 0 = off and 1 = on.	x
View audio mute status	Z/z	X3 ↵	Mute status is (0=off, 1=on).	
Mic level				
Specify gain	16* X4 G	Aud X4 ↵	X4 = audio gain in dB = 0 to 12. This variable is a positive number.	x
Specify attenuation	16*X5 g	Aud X5 ↵	X5 = attenuation in dB = 1 to 66. This variable is a positive number.	
View mic volume	16G/g	X6 ↵	X6 = overall mic gain or attenuation between -66 dB and +12 dB. This response variable indicates attenuation as a negative number and gain as a positive number.	
Mic mute on/off				
Turn mic mute on/off	X3 M/m	Mix X3 ↵	Toggles mic mute on or off. X3: 0 = off, 1 = on.	x
View mic mute status	M/m	X3 ↵	Mic mute status: (0=off, 1=on).	
Mic talk-over threshold				
Display talk-over threshold	X8 * 2 #	Thr X8 ↵	Shows the mic threshold number. X8 = 0 through 15, default = 8.	
Decrement threshold	– * 2#	Thr X8 ↵	Decrements mic threshold one step.	
Increment threshold	+ * 2#	Thr X8 ↵	Increments mic threshold one step.	
View mic talk threshold	2 #	X8 ↵		

Command	ASCII Command (host to switcher)	Response (switcher to host)	Description	Switcher-initiated messages
Status command of Mic DIP switches				
Read status of DIP switch positions	41S	X18•X19↵	X18 = 48V phantom power (0=off, 1=on) X19 = Mic/Line input (0=Mic, 1=Line)	
Front panel security lockout (executive mode)				
Lock front panel access	2X/x	Exe 2↵	Locks volume, mic, input selection.	X
Lock front panel mic controls	1X/x	Exe 1↵	Locks mic controls.	X
Unlock front panel access	0X/x	Exe 0↵	Unlocks front panel.	X
View Lock Status	X/x	X3↵	Lock status is (0=off, 1=on)	
System reset (to factory defaults)				
Reset switcher to factory defaults	Esc ZXXX←	Zpx ↵	Resets the system to the following factory defaults: Mode X7 = 1 Input X11 = 1 Main Volume X10 = 70 Mic Volume X4 = 0 Executive Mode X3 = 0 Mic threshold X8 = 8 Follow Sub Mode X3 = 0 Mic Power X3 = 0 Ducking Level X12 = 6	
Request information				
View current selection status	I/i	Mod X7 1G X2 2G X2 3G X2 4G X2 = X1G X2↵	Displays selected input in each group and input routed to the program audio output. X7 1 = Single Switcher mode, 2 = Separate Switcher mode X1 = Group 1 through 4 (1 = VGA, 2 = DVI, 3 = HDMI, 4 = Composite). X2 = Inputs 0 through 2 (0-3 for HDMI) for each group (input 0 = off).	
Firmware Update/Upload				
Upload firmware	Esc Upload ←	Upl ↵		
Query Firmware version				
Query firmware version	Q/q	X10↵	X10 = firmware version number to the second decimal.	
Setup/Naming commands				
Set the unit name	Esc X19 CN ←	Ipn • X19↵		
Return the unit name to default	Esc •CN ←	Ipn•MPS-409↵		
View unit name	Esc CN ←	Ipn • X19↵		
Request part number				
Request part number	N/n	60-*xxxx-xx* ↵	Displays the MPS 409 part number	

Command	ASCII Command (host to switcher)	Response (switcher to host)	Description	Switcher-initiated messages
EDID Minder				
Enable EDID Minder (DVI Group only)	Esc X3 EDID←	EDID•X3↵	X3 = 1, Enabled (default) X3 = 0, Disabled	
View EDID Minder status (DVI Group only)	Esc EDID←	X3↵		
Assign EDID to inputs	Esc A X1*X16 EDID ←	X1 EDID•A•X16 ↵	X1 = video group 1 or 2 (1=VGA, 2=DVI) X16 = 0, Automatic Mode (default) X16 = 1-19, factory EDID (see page 27) X16 = 20, user loaded EDID	
View EDID assignment	Esc A X1*EDID ←	X16↵		
Save display EDID to user location	Esc S X1*EDID←	X1EDID • S ↵	Save display EDID of the output group to the user location of that video group.	
View/Read EDID in hex format	Esc R X1*EDID ←	X17 ↵	Read HEX data (as text) from currently selected EDID in specified video group.	
View EDID native resolution	Esc N X1*EDID ←	X18 ↵	Read native resolution and refresh rate from currently selected EDID in specified video group. **Example:** 1920x1200@60Hz	

EDID NOTES:

EDID Minder is only supported on the VGA and DVI video groups. Attempting to assign an EDID file to the HDMI or composite video group (X1 = 3 or 4) will give an error (E13).

In DVI/HDMI input combine mode, the DVI inputs are routed to the HDMI output. The EDID of the HDMI output is used for the DVI group inputs when DVI/HDMI combine mode is enabled.

For the DVI video group, X16 = 12-13 are 256-Byte EDID files, each containing a CEA 861 extension block, with the listed audio support. For the VGA video group, these EDID files are 128-Byte with no audio support, so they are repeated for consistency.

EDID Format Cross-reference Table

X16	Native Resolution	Refresh	Pixel Clock
0	Automatic Mode		
1	800 x 600	60 Hz	40 MHz
2	1024 x 768	60 Hz	65 MHz
3	1280 x 768	60 Hz	79.5 MHz
4	1280 x 800	60 Hz	83.5 MHz
5	1280 x 1024	60 Hz	108 MHz
6	1360 x 768	60 Hz	85.5 MHz
7	1440 x 900	60 Hz	106.5 MHz
8	1400 x 1050	60 Hz	121.75 MHz
9	1680 x 1050	60 Hz	119 MHz
10	1600 x 1200	60 Hz	162 MHz
11	1920 x 1200	60 Hz	154 MHz
12	720p, basic audio	50 Hz	74.25 MHz
13	720p, basic audio	60 Hz	74.25 MHz
14	720p, full audio	50 Hz	74.25 MHz
15	720p, full audio	60 Hz	74.25 MHz
16	1080p, basic audio	50 Hz	148.5 MHz
17	1080p, basic audio	60 Hz	148.5 MHz
18	1080p, full audio	50 Hz	148.5 MHz
19	1080p, full audio	60 Hz	148.5 MHz
20	User loaded		

NOTE: **Basic Audio** supports: 2-Ch PCM audio

Full Audio supports: 2-Ch PCM, 8-Ch PCM, 8-Ch AC-3, 8-Ch DTS, 8-Ch DD+, 8-Ch DTS-HD, & 8-Ch Dolby TrueHD

Updating Firmware

The Firmware Loader program allows replacing firmware without taking the MPS 409 out of service. First obtain the latest firmware, then update the firmware using Firmware Loader.

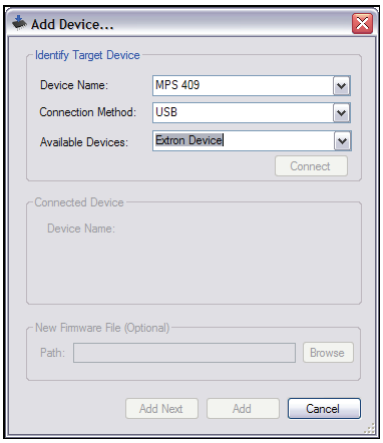
Download the latest firmware file:

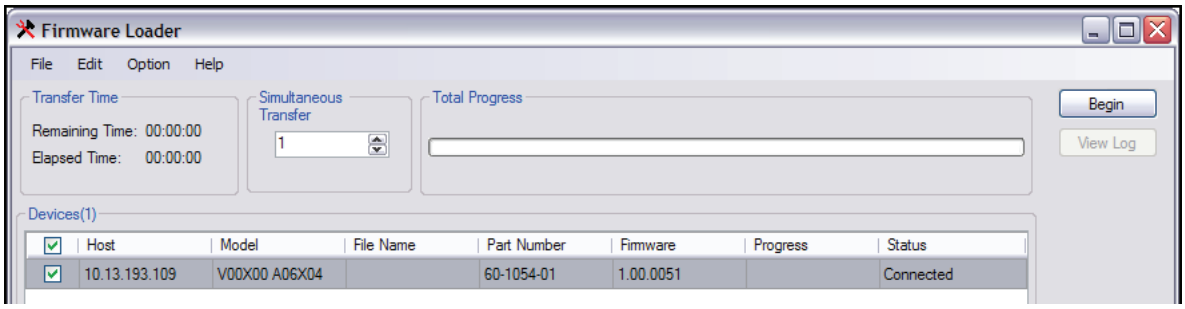
1. Visit the Extron Web site, **www.extron.com**. From the Product page, locate and select the MPS 409 (in the left column select **Switchers > Media Presentation Switchers > MPS 409**).
2. On the MPS product page, select the download tab and locate the most recent firmware file, release notes, and firmware update instructions. Save these files on your computer hard drive, and note the file path of the folder where the files have been saved.

To access the firmware uploader:

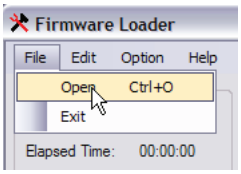
1. From the Windows start menu, select **All Programs > Extron > Firmware Loader > Firmware Loader** program.
2. The **Add Device** dialog box appears. Select the MPS 409 device name and USB as the connection method, then select the Extron device from available devices and press **OK.**

   The main screen appears.





3. From the toolbar, select **File > Open**.
4. Locate the downloaded firmware file and click to select it.
5. Click **Begin** on the main screen. The total progress bar tracks the loading progress.
6. When the **Transfer Complete!** message appears, the upload is finished. Exit the program by selecting **File > Exit**.



The firmware upload is complete.

Reference Information

This section discusses the specifications, part numbers, and accessories for the MPS 409. Topics that are covered, include:

- **Specifications**
- **Part Numbers and Accessories**
- **Cables and Connectors**

Specifications

Video — VGA

Gain	Unity
Bandwidth	350 MHz (-3 dB)
Crosstalk	-50 dB @ 10 MHz, -30 dB @ 100 MHz
Switching speed	<5 ms (max.)

Video — HDMI

Maximum data rate	6.75 Gbps (2.25 Gbps per color)
Maximum pixel clock	225 MHz
Resolution	Up to 1920x1200 or 1080p @ 60 Hz, 12 bit color
Formats	RGB and YCbCr digital video
Standards	DVI 1.0, HDMI 1.3, HDCP 1.1

Video — DVI

Maximum data rate	4.95 Gbps (1.65 Gbps per color)
Maximum pixel clock	165 MHz
Resolution	Up to 1920x1200 or 1080p @ 60 Hz
Formats	RGB and YCbCr digital video
Standards	DVI 1.0, HDMI 1.2, HDCP 1.1

Video — composite video

Gain	Unity
Bandwidth	300 MHz (-3 dB)
Crosstalk	<-60 dB @ 5 MHz
Differential phase error	1.0° at 3.58 MHz and 4.43 MHz
Differential gain error	1.0% at 3.58 MHz and 4.43 MHz
Switching speed	<20 ms

Video input

Number/signal type

VGA inputs	2 VGA-QXGA RGBHV, RGBS, RGsB, RsGsBs, HDTV component video (Y, R-Y, B-Y)
DVI inputs	2 single link DVI-D (or HDMI)
HDMI inputs	3 HDMI (or single link DVI-D)
Composite video inputs	2 NTSC/PAL/SECAM composite video

Connectors

VGA inputs	2 female 15-pin HD
DVI inputs	2 female DVI-I
HDMI inputs	3 female HDMI type A
Composite video inputs	2 female BNC

Nominal level

VGA inputs	1.0 Vp-p for Y of component video 0.7 Vp-p for RGB and for R-Y and B-Y of component video
Composite video inputs	1 Vp-p (including sync)

Minimum/maximum levels

VGA inputs	Analog 0.3 V to 1.5 Vp-p with no offset
Composite video inputs	Analog 0.4 V to 2.0 Vp-p with no offset

Impedance	75 ohms
Horizontal frequency	15 kHz to 145 kHz
Vertical frequency	30 Hz to 170 Hz

Return loss

VGA inputs	<-40 dB @ 5 MHz
Composite video inputs	<-40 dB, 0 to 10 MHz

Video output

Number/signal type

VGA outputs	1 VGA-QXGA RGBHV, RGBS, RGsB, RsGsBs, HDTV component video (Y, R-Y, B-Y)
DVI outputs	1 single link DVI-D (or HDMI)
HDMI outputs	1 HDMI (or single link DVI-D)
Composite video outputs	1 composite video

Connectors

VGA outputs	1 female 15-pin HD
DVI outputs	1 female DVI-I
HDMI outputs	1 female HDMI type A
Composite video outputs	1 female BNC

Nominal level

VGA outputs	1.0 Vp-p for Y of component video 0.7 Vp-p for RGB and for R-Y and B-Y of component video
Composite video outputs	1.0 Vp-p (including sync)

Minimum/maximum levels

VGA outputs	Analog, 0.3 V to 1.5 Vp-p
Composite video outputs	Analog, 0.4 V to 2.0 Vp-p

Impedance	75 ohms
Return loss (VGA output)	<-40 dB @ 5 MHz

DC offset (max. allowable, VGA output)

±5 mV with input at 0 offset

Sync — VGA and composite video groups

Input type (VGA group)	RGBHV, RGBS, RGsB, RsGsBs, bi-level and tri-level sync
Output type (VGA group)	RGBHV, RGBS, RGsB, RsGsBs Tri-level sync on Y, R-Y, B-Y channels for 720p, 1080i, or 1080p component video Bi-level sync on Y channel for all other component video rates
Standards (composite video)	NTSC 3.58, NTSC 4.43, PAL, SECAM
Input level	1.9 V to 5.0 Vp-p
Output level	TTL: 5.0 Vp-p (unterminated) for RGBHV, RGBS 0.6 Vp-p for component video tri-level sync 0.3 Vp-p for component video bi-level sync

Input impedance	510 ohms
Output impedance	75 ohms
Max. input voltage	5.0 Vp-p
Max. propagation delay	30 ns
Max. rise/fall time	4.2 ns
Polarity	Positive or negative (follows input)

Audio — individual audio groups (VGA, DVI, HDMI, composite video)

Gain	Unbalanced output: 0 dB; balanced output: +6 dB
Frequency response	20 Hz to 20 kHz, ±0.5 dB
THD + Noise	0.01% @ 1 kHz at nominal level
S/N	>90 dB at maximum output (unweighted)
Crosstalk	<-72 dB @ 1 kHz or below, <-45 dB @ 20 kHz
Stereo channel separation	>80 dB @ 20 Hz to 20 kHz

Audio input — individual audio groups (VGA, DVI, HDMI, composite video)

Number/signal type	
HDMI inputs	3 stereo, unbalanced
All other inputs	2 stereo, unbalanced, per each (VGA, DVI, composite video) input group
Connectors	
Composite video inputs	2 pairs of female RCA connectors
HDMI inputs	3 female 3.5 mm stereo mini jacks; tip (L), ring (R), sleeve (GND)
All other inputs	2 female 3.5 mm stereo mini jacks per input group; tip (L), ring (R), sleeve (GND)
Impedance	>10k ohms unbalanced, DC coupled
Nominal level	-10 dBV (316 mVrms)
Maximum level	+8.2 dBV, (unbalanced) at 1% THD+N
Input gain adjustment	-24 dB to +18 dB, adjustable per input

NOTE: 0 dBu = 0.775 Vrms, 0 dBV = 1 Vrms, 0 dBV ≈ 2 dBu

Audio output — individual audio groups (VGA, DVI, HDMI, composite video)

Number/signal type	1 stereo, unbalanced, per each group
Connectors	
Composite video output	1 pair of female RCA connectors
All other outputs	1 female 3.5 mm stereo mini jack per group (VGA, DVI, HDMI); tip (L), ring (R), sleeve (GND)
Impedance	50 ohms unbalanced
Gain error	±0.1 dB channel to channel
Nominal level	-10 dBV (316 mVrms)
Maximum level (Hi-Z)	>+8.2 dBV unbalanced at 1% THD+N
Maximum level (600 ohm)	>7.1 dBm unbalanced at 1% THD+N

Audio — program audio

Gain	
When program volume is at default:	-15 dB for unbalanced output, -9 dB for balanced output
When program volume is at maximum:	0 dB for unbalanced output, +6 dB for balanced output
Program volume range	0 to 100
Frequency response	20 Hz to 20 kHz, ±0.5 dB
THD + Noise	0.08% @ 1 kHz, 0.1% @ 20 kHz at nominal level
S/N	>90 dB at maximum output (unweighted)
Crosstalk	-105 dB @ 1 kHz, -91 dB @ 20 kHz (when all inputs are terminated) -93 dB @ 1 kHz, -70 dB @ 20 kHz (when all inputs are unterminated)
Stereo channel separation	100 dB @ 20 Hz, 80 dB @ 1 kHz, >55 dB @ 20 kHz

Audio output — program audio

Number/signal type	1 stereo, balanced/unbalanced
Connector	(1) 3.5 mm captive screw connector, 5-pole
Impedance	50 ohms unbalanced, 100 ohms balanced
Gain error	±0.1 dB channel to channel
Nominal level when the main volume is set to default	-2 dBu (632 mVrms) balanced output
Maximum level (Hi-Z)	>16.5 dBu balanced, >8.2 dBV unbalanced at 1% THD+N
Maximum level (600 ohm)	>10.4 dBm balanced, >7.1 dBm unbalanced at 1% THD+N
Talk-over (ducking) response time (typical)	
Attack time	Instant
Release delay	5 seconds
Release time	1 second
Ducking level	0 dB to 30 dB, adjustable; default = +6 dB

Microphone input

Number/signal type	1 mono balanced/unbalanced
Connector	(1) 3.5 mm captive screw connector, 3-pole
Impedance	>2.3k ohms unbalanced, >10k ohms balanced
Nominal level	-60 dBV (1 mV) when mic volume is set to 0 dB gain
Minimum level	-72 dBV (0.25 mVrms) when mic volume is set to +12 dB gain
Maximum level	-16 dBV (158 mVrms) at 1% THD+N when mic volume is set to -20 dB gain
Microphone volume range	-66 dB to +12 dB
Microphone DC power	+48 VDC phantom power, can be turned on or off

Control/remote — switcher

Serial control port	1 RS-232, 3.5 mm captive screw connector, 3-pole, rear panel
Baud rate and protocol	9600 baud, 8 data bits, 1 stop bit, no parity
Serial control pin configuration	2 = Tx, 3 = Rx, 5 = GND
USB control ports	1 front panel female mini USB B
USB standards	USB 2.0, low speed
Program control	Extron control program for Windows® Extron Simple Instruction Set™ (SIS™)

General

Power	100 VAC to 240 VAC, 50-60 Hz, 20 watts, internal
Temperature/humidity	Storage -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Cooling	Convection, no vents
Thermal dissipation, full load	
115 VAC, 60 Hz	32.5 BTU/hr
240 VAC, 50 Hz	32.6 BTU/hr
Mounting	
Rack mount	Yes, with included brackets
Furniture mount	Yes, with optional under-desk mounting kit
Enclosure type	Metal
Enclosure dimensions	1.75" H x 17.4" W x 8.5" D (1U high, full rack wide) 4.4 cm H x 43.2 cm W x 21.6 cm D (Depth excludes connectors and knobs. Width excludes brackets.)
Product weight	7.0 lbs (3.2 kg)
Shipping weight	10 lbs (5 kg)
Vibration	ISTA 1A in carton (International Safe Transit Association)

Regulatory compliance

Safety	CE, c-UL, UL
EMI/EMC	CE, C-tick, ICES, FCC Class A, VCCI
MTBF	30,000 hours
Warranty	3 years parts and labor

NOTE: All nominal levels are at ±10%.

NOTE: Specifications are subject to change without notice.

Part Numbers and Accessories

Included Parts

These items are included in each order:

Included parts	Replacement part number
MPS 409	60-1012-01
MBU 149 1U Full Rack Under-Desk Mount Kit	70-077-03
Tweeker (small screwdriver)	
3.5 mm, 3-pole captive screw connector (2)	
3.5 mm, 5-pole captive screw connector	
IEC power cord	
MPS 409 Setup Guide	
Rubber feet (self-adhesive) (4)	

Optional Accessories

These items can be ordered separately:

Part description	Part number
RCAF-BNCM (10)	100-229-01
SYM BNCM Series HD male to BNC male (6 in. to 100')	26-533-*xx*
CSR 6, captive screw male to 2 RCA female adapter	26-575-01
MSR 6, 3.5 mm mini stereo male to 2 RCA female adapter	26-592-01
IR 102 Universal Remote Control Kit	70-224-10

Cables and Connectors

When using signals with a scanning frequency of 15–125 kHz and running distances of 100 feet or more, use high resolution BNC cables to achieve maximum performance.

Pre-cut Cables

VGA-A M-M MD with audio cable	Part number
Lengths from 3' to 50'	26-490-*xx*
VGA M to BNC M MHR cable, SYM BNCM Series	**Part number**
Lengths from 6" to 100'	26-533-*xx*
S-video M-M cable, MHR-2 SVM-M	**Part number**
Lengths from 6" to 100'	26-316-*xx*
Single Link DVI-D Male to Male Cables, DVID SL Pro Series	**Part number**
Lengths from 3' to 200'	26-649-*xx*
High Speed and Standard Speed HDMI Cables, HDMI Pro Series	**Part number**
Lengths from 3' to 200'	26-650-*xx*
Standard Speed HDMI to DVI-D Cables	**Part number**
HDMI DVI-D/xx lengths from 3' to 50'	26-614-*xx*
Mini-Audio cable, 3.5 mm Stereo Male to Male	**Part number**
2', 6', 12', 25'	26-571-01, -02, -06, -07

Bulk Cable

Bulk cable	Part number
MHR-2, 2 Conductor Mini High Resolution S-Video Cable, 500 feet, non-plenum	22-123-03
MHR-5, Five Conductor MHR - Mini High Resolution, 500 feet	22-020-02
MHR-5STP-2, Five Conductor MHR and Two Shielded Twisted Pairs Plenum Cable	22-175-02
M59-3, Three Conductor Mini 59 Flex Cable	22-185-02
RG59, Single Conductor RG59 High Resolution	22-145-02
RG6-1, Single Conductor RG6 Super High Resolution	22-098-02
MHRVGA, Mini High Resolution VGA Cable non-plenum	22-024-01
STP22-2, Serial Control/Audio	22-160-03
STP20-2, Serial Control/Audio Cable, non-plenum	22-161-03

Assorted Connectors

Crimp connectors (qty. = 50)	Part number
Mini HR, BNC Male	100-250-01
Gold Plated Male Center Pins for MHR BNC Connectors	100-256-01

Solder connectors (qty. = 10)	Part number
RCA-3502, RCA Male	100-333-01
RCA-HQ, RCA Male	100-334-01
1/4" Stereo Phone-HQ	100-332-01
3.5 mm Mini Stereo-HQ, Male Stereo Audio	100-331-01

BNC compression connectors (qty. = 50)	Part number
Mini HR, Male-nickel	100-186-01

RCA compression connectors (qty. = 50)	Part number
Mini HR, Male-nickel	100-302-01

Extron® Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America, and Central America:
Extron Electronics
1001 East Ball Road
Anaheim, CA 92805
U.S.A.

Japan:
Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

Europe, Africa, and the Middle East:
Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

China:
Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Asia:
Extron Asia
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Middle East:
Extron Middle East
Dubai Airport Free Zone
F12, PO Box 293666
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions, or modifications were made to the product that were not authorized by Extron.

NOTE: If a product is defective, please call Extron and ask for an Application Engineer to receive an RA (Return Authorization) number. This will begin the repair process.

USA: (714) 491-1500 **Europe**: 31.33.453.4040
Asia: 65.6383.4400 **Japan**: 81.3.3511.7655

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

Extron **USA - West** Headquarters	Extron **USA - East**	Extron **Europe**	Extron **Asia**	Extron **Japan**	Extron **China**	Extron **Middle East**
+**800.633.9876** Inside USA/Canada Only	**+800.633.9876** Inside USA/Canada Only	**+800.3987.6673** Inside Europe Only	**+800.7339.8766** Inside Asia Only	**+81.3.3511.7655**	**+400.833.1568** Inside China Only	**+971.4.2991800**
+1.714.491.1500	**+1.919.863.1794**	**+31.33.453.4040**	**+65.6383.4400**	**+81.3.3511.7656** FAX	**+86.21.3760.1568**	**+971.4.2991880** FAX
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